NOTE XLI.

DESCRIPTIONS OF EARTHWORMS.

BY

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III [1]).

On *Acanthodrilus Büttikoferi*, Horst.
(Plate 5).

During his last journey in Liberia, my colleague Mr. Büttiköfer had the opportunity to collect a number of earthworms under a mouldering palm-tree. Among them I met with some specimens of *Ac. Büttikoferi*, a species which I briefly described in this Journal, Vol. VI, p. 105. However this description being based upon the examination of a single very badly preserved individual, I wish to give in the following note some illustrations and a more full account of the distinguishing characters of this species. The number of described species of Lumbricidae from all parts of the world is increasing daily, and it is a well-known fact to every-one, dealing with this matter, that it is hardly possible to determine the systematic position of earthworms only by their external features; therefore I believe it to be an absolute necessity to indicate accurately not only their external but also their internal characters.

In all our specimens the clitellum is very apparent,

1) For Part I see p. 97—106 and pl. 1, and for Part II p. 247—258 and pl. 4 of this volume.

extending from segment 13 (14) to 19; it is distinguished from the remaining part of the body as well by its darker colour, as by the pronounced glandular integument of its segments. However at its ventral side there is a small area without glandular development, bounded on each side by a narrow groove, that runns from the genital pore on the 17th segment to that on the 19th ring. Each segment is divided by two transverse grooves in three annuli, the median of which is elevated as a ridge and bears the bristles; the longitudinal diameter of a segment in front of the girdle is as large as that of three segments behind it. The dorsal pores appear to commence behind the clitellum.

The penial setae differ widely in their appearance from those of *Ac. Schlegelii*; they were already described in my foregoing paper and are illustrated in figg. 2 and 3.

In dissecting our worm from the dorsal side we are struck by the strong development of the mesenteries in segment 5 to 12; especially the anterior of them are so stout and thick, that the intestinal tract is entirely concealed by them (fig. 1). Apparently this has been the cause, that I overlooked before a remarkable character of the alimentary canal, hitherto not observed in any species of *Acanthodrilus*, viz. the presence of two gizzards. A short oesophagus leads from the pharynx to the first gizzard and extends into the 5th segment; it has a somewhat conical shape and its anterior portion lies entirely concealed between two large glands, fixed on the 5th septum, its posterior margin being limited by a rather deep constriction. The first gizzard (fig. 4, *g*) lies in the 6th segment and is separated by a narrow, thin-walled, oesophageal portion from the second gizzard (fig. 4, *g'*), which extends into the 8th ring.

Though we know some other Lumbricidae (*Digaster*, *Moniligaster*, *Didymogaster*) to possess two or more distinct gizzards, it is the first time, as far I am aware of, that we meet with a species, showing the same character, but

belonging to a genus, the other species of which are characterized by the presence of only a single gizzard. From this fact we may infer, that it is not permitted to consider such characters as marks of generic difference, if they are not accompanied by other characters, especially by those relating to the generative system. Therefore I am inclined to assume, that the worm, described by Mr. Benham [1]) as *Trigaster Lankesteri*, which agrees in its main characters with *Acanthodrilus*, except in the presence of three gizzards, really belongs to this genus.

The vascular system possesses a dorsal vessel, being a single tube, which communicates with the ventral trunk by 4 pairs of transverse hearts, situates in segment 6, 7, 8 and 9; from the third of these commissural vessels a strong branch arises, running along the anterior side of the 8th mesentery. In the 10th, 11th, 12th and 13th ring there are situated large abdominal hearts, which arise from the supra-intestinal vessel and communicate by a small branch with the dorsal trunk. Moreover in the 10th segment a pair of lateral vessels arises from the dorsal side of the intestine; they run forward along the side of the gizzards and communicate with each other by a transverse vessel in the 7th ring. The lateral vessels agree much in their arrangement with those of *Ac. Schlegelii.*

As stated in my first note, we find in the 13th segment a pair of vesiculae seminales, containing spermatozoa in different stages of development (fig. 5).

The ovaries are situated in the 14th segment; they have the appearance of a rather broad, ribbon-shaped body, showing numerous folds, radiating from its base. The basal portion of the ovary consists of indifferent germinal cells, while its inferior half contains several fully developed eggs, lying each in a well-defined capsule of connective tissue (fig. 6).

In stead of the real segmental organs we find in each

1) Quart. Journal of Microsc. Science, Vol. XXVII, 1887, p. 94.

segment, beginning from the 13th, a narrow tranverse strip, consisting of tufts of faint coiled tubes. In the 5th, 6th and 7th segment there are three pairs of racemous glands, made up of numerous loop-like coiled tubules, supplied by a network of capillaries, which show several dilatations in their course; their structure is quite similar to that of the »grape-like glands" in *Trigaster Lankesteri*, circumstantially described and illustrated by Mr. Benham [1]).

On *Allobophora Oerleyi*, n. sp.

Lumbricus terrestris, var. *platyurus* Oerley; A magyarországi Oligochaeták Faunája, I, Terricolae, p. 583, pl. I, fig. 1, *d.*

We owe to the kindness of Dr. L. Oerley a fine collection of earthworms from Hungary, enumerated and described by him in the above-named catalogue [2]). Among these worms there are three specimens, labelled *Lumbricus terrestris*, var. *platyurus* mihi. From a careful examination of these specimens I must conclude, that they cannot be assigned to the genus *Lumbricus*, neither can be identified, so far I am aware of, with one of the hitherto described species.

The individuals before me measure from 100 to 120 m.m. in length; the number of their segments is about 145. The body is cylindrical, somewhat octogonal, resulting from the presence of eight prominent series of bristles; it is nearly equally broad over its whole length, only its anterior portion before the girdle being somewhat thickened. The cephalic lobe is broad, triangular, impinging over the half of the buccal segment, without a longitudinal groove at the ventral side. Each segment is furnished with a transverse groove over its middle. The dorsal pores are

1) Loc. cit. p. 96, pl. IX, fig. 35 and 36.

2) I regret not to be able to understand Mr. Oerley's diagnosis, these being written in the Hungarian tongue.

beginning between the 5th and 6th ring. The clitellum consists of 6 well-defined segments, extending from the 25th—30th ring; a ridge of genital tubercles is present on segment 26, 27, 28 and 29. The setae are protruding strongly out of the bodywall and are furnished on their distal portion with small arches, resembling the bristles of *Criodrilus*. They are arranged in eight series, separated by a rather large space from each other; the medial lateral interval is as large as the superior lateral, but smaller than the inferior lateral interval, which is about as large as the ventral one. The dorsal interval is nearly twice as broad as the ventral one.

The number of copulatory pouches varies in the different specimens. One individual has four pairs of them, in the 7th, 8th, 9th and 10th segment, situated in front of the posterior septum; their external apertures lie in a line with the superior dorsal setae. The second specimen has but three pairs of copulatory pouches in the 8th, 9th and 10th segment, and the third specimen has only two pairs of them, those of the left side situated in segment 7 and 8, those of the right side in segment 8 and 9. It appears therefore to me that four pairs of copulatory pouches is in all probability the typical number in fully-developed specimens. This is not the first time that a variation is observed in the number of copulatory pouches, for Beddard tells us [1]), that he examined a *Perichaeta*-species from Manila, in which these organs varied in number in the most extraordinary way and the same author stated several variations in the number of spermathecae in *Perionyx excavatus* [2]).

There are three pairs of vesiculae seminales in segment 9, 11 and 12; the first pair of them is fixed to the anterior, the second pair to the posterior septum of the 10th

1) Observations on the structure of *L. complanatus* Dugès; Proc. R. Soc. of Edinburgh, 1885—86, p. 453.

2) Proc. Zool. Soc. of London, 1886, p. 308.

ring, and the third pair to the posterior wall of the 11th segment. The funnels of the vasa deferentia are situated in segment 10 and 11. The ovaria are contained in the 13th segment; their shape is quite similar to that of *L. terrestris*. A gizzard and the oesophageal glands are also present, like in the last named species.

As stated above, I believe that our specimens cannot be identified with one of the species described before. By the presence of widely distant bristles, the hidden position of the male genital pores, and the compressed tail, they show much resemblance to *Allobophora complanata*, but in this species the clitellum consists of 10 segments (28th—37th), and the number of copulatory pouches amounts to 7 pairs [1]). In *Allob. Boeckii* Eis. [2]) the setae are also widely separated from each other, showing a position quite similar to that of our specimens; but according to the conformable descriptions of Eisen and Rosa, this species has a small size, its number of segments amounting only to 90, and the clitellum is situated more backward, extending from segment 29 to 33 (34). Perhaps our individuals may belong to the *Enterion platyurum*, observed by Fitzinger in Austria, and characterized by having »keine Genitalporen? Gürtel aus 6 Ringen, Borsten gleichweit" [3]). Unfortunately nothing is mentioned by him about the number of its copulatory pouches, that in our specimens is greater than in any other of the European species, except in *Allob. complanata*. Therefore I propose to name our species after the Hungarian naturalist, that first described it.

1) Conf. Rosa, I Lumbricidi del Piemonte, p. 40, fig. 2, 3 and 4; — Beddard, loc. cit.; — Ude, Ueber die Rückenporen der terricolen Oligochaeten, Zeitschr. f. Wissensch. Zoologie, Bd. XLIII, p. 137.

I had recently the opportunity of confirming the correctness of these characters in two specimens from Algeria, kindly collected for me by Dr. H. ten Kate; the first dorsal pore lies between segment 12 and 13, as mentioned by Ude, but is somewhat concealed and therefore perhaps overlooked by Rosa.

2) Rosa, loc. cit. p. 48.

3) Isis, 1833, p. 553.

On *Lumbricus terrestris* var. *stagnalis* (Hoffm.) Oerley.

On page 583 of his Fauna above referred to, Mr. Oerley mentions *L. terrestris* var. *stagnalis* Hoffm. Of this variety I found four individuals in the collection, presented to our Museum by the Hungarian naturalist. In examining these earthworms I observed, that like the foregoing specimens they cannot be assigned to *L. terrestris*, but that in their external characters they show more resemblance to *Allob. complanata*.

The largest of our specimens has a length of 88 m.m., the number of its segments being about 125. The cephalic lobe impinges into the buccal ring only to the half of its length. The segments 1—14 have a longitudinal diameter about twice as large as that of the following segments. The clitellum consists of 8 to 9 segments, extending from the 29th (30th) to the 37th (38th) ring. The first dorsal pore is situated between segment 6 and 7. The openings of the segmental organs lie somewhat outward from the series of the external setae of the ventral pair. The setae are arranged in eight series, being separated from each other by a rather broad space; the superior lateral interval is as large as the inferior one, on the contrary the medial lateral interval is somewhat larger and measures two thirds of the ventral one.

In dissecting one of these worms from the dorsal side, I was no less surprized to find it presenting 5 pairs of copulatory pouches, situated in segment 6, 7, 8, 10 and 11; the three anterior pairs of them lie in front of the posterior wall of their segments, while those of the 10th and 11th ring are situated behind the anterior septum. In all our four specimens I found not only the same number, but also the same arrangement of the copulatory pouches; therefore I believe it may be considered as a specific character. There are 4 pairs of seminal vesicles occupying segment 9—12; of these the second pair is the least developed, the fourth pair is the largest. The first pair of vesiculae seminales is attached to

the anterior side of the 9th septum; the 10th septum bears the second pair of them on its anterior side, the third pair on its posterior side, while the fourth pair is fixed on the posterior side of the 11th mesentery. The two anterior pairs agree in their appearance and are somewhat retort-shaped. The funnels of the vasa deferentia lie free in segment 10 and 11.

In comparing our specimens with the known species, they appear to approach very nearly *Allob. complanata*, agreeing with this species as well in the position of the girdle as in the arrangement of the setae and the presence of 4 pairs of seminal vesicles; however there are two important points of difference between them, viz. the number of copulatory pouches and the situation of the dorsal pores. Though it is stated by Dugès [1]), that in *Allob. complanata* the number of spermathecae is not always the same, but depends on its state of sexual maturity, however in adult individuals 7 pairs of them appear always to be present; Rosa [2]) at least states, that he examined very many specimens and he never could find the slightest variation. While all our specimens had a well-developed girdle and were without doubt in a condition of sexual maturity, I believe we must consider the disagreement in the number of the spermathecae between both species as marks of specific difference. In the position of the first dorsal pore our specimens differ also from *Allob. complanata*, and though this may be a character of not much importance, it results from Ude's investigations [3]), that the situation of the first dorsal pore in the different species is rather constant and not subject to much variation. Mr. Oerley seems to have identified our specimens with the *L. stagnalis* Hoffm. [4]); I believe it may be possible, however Hoffmeister's species is too imperfectly characterized to admit of recognition with

1) Annal. Sc. Nat. Tom. XV, 1828, p. 327.
2) Loc. cit. p. 42.
3) Loc. cit. p. 121.
4) Die jetzt bekannten Arten aus der Familie der Regenwürmer, p. 35, fig. 7.

certainty. It appears to me, that *L. stagnalis* by no means can be identical with *Allob. complanata*, as suggested by Beddard; there is too great a difference in the shape of the tail in both species. In *Allob. complanata* the tail is compressed, »en forme de feuille de myrte" according to Dugès, »in figura di foglio d'olivo" according to Redi, whereas in *L. stagnalis* the posterior part of the body is »scharf vierkantig" (Hoffmeister).

EXPLANATION

OF

Plate 5.

Fig. 1. *Ac. Büttikoferi* Horst; general view of the contents of the body-cavity: *gl.* intestinal coeca; *lv.* lateral vessel; *n.* modified nephridia; *o.* ovary; *pr.* prostate gland; *vs.* vesicula seminalis.

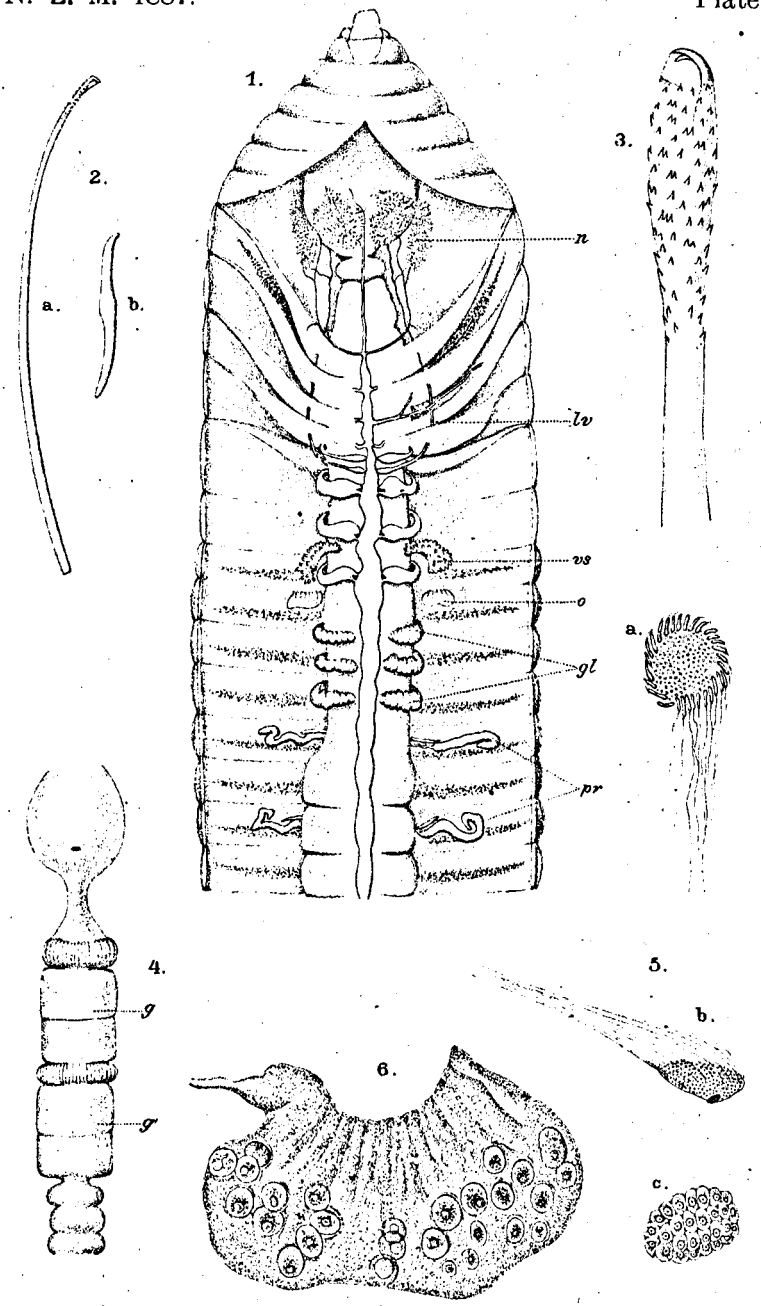
Fig. 2. *a.* Penial seta; *b.* ordinary seta. × 36 diam.

Fig. 3. The free extremity of a penial seta, highly magnified.

Fig. 4. The anterior part of the intestinal tract, to show the two gizzards *g* and *g'*. × 2 diam.

Fig. 5. Contents of the vesicula seminalis, highly magnified.

Fig. 6. A portion of the ovary. × 36 diam.



Dr. R Horst ad nat. del. A. J. J. Wendel lith. P. W. M. Trap impr.

Acanthodrilus Büttikoferi *Horst.*